UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,609	07/07/2003	James Robert Paterek	GTI-1532	7465

33058 7590 12/07/2005

MARK E. FEJER
GAS TECHNOLOGY INSTITUTE
1700 SOUTH MOUNT PROSPECT ROAD
DES PLAINES, IL 60018

EXAMINER	
WARE, DEBORAH K	

ART UNIT	PAPER NUMBER
1651	

DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/614,609	PATEREK, JAMES ROBERT	
	Examiner	Art Unit	
	Deborah K. Ware	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) *10-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/7/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-16 are pending.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on July 7, 2003, received. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Election

Applicant's election of Group I, claims 1-9 in the reply filed on November 14, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 9-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on November 14, 2005.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422

F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-9 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 and 11 of U.S. Patent No. 6,887,692 in view of US Patent No. 5,821,111, and U.S. Patent No. 4,052,173.

Claims are drawn to method for hydrogen production comprising steps of introducing a feedstock comprising at least one biodegradable solid and forming a liquid effluent in a first anaerobic bioreactor, transferring the effluent into a second anaerobic bioreactor having a plurality of hollow semipereable fibers with outer surface coated with a biofilm comprising at least one hydrogenogenic bacteria for forming hydrogen in the lumen of the fibers, and removing the hydrogen therefrom. Method can be carried out under thermophilic conditions.

U.S. Patent No. 6,887,692 teaches method for hydrogen production comprising steps of introducing a feedstock comprising at least one biodegradable solid and forming a liquid effluent in a first anaerobic bioreactor under thermophilic conditions, transferring the effluent into a second anaerobic bioreactor having aplurality of hollow semipereable fibers with outer surface coated with a biofilm comprising at least one hydrogenogenic bacteria (i.e. photosynthetic bacteria) forming hydrogen and exhausting

or removing the hydrogen therefrom. Note each of claims 1-3 and 11. Also note that hydrogenogenic bacteria can include any bacteria capable of producing hydrogen, note column 3, lines 38-39, for more detailed description of the claimed photosynthetic bacteria in claim 1 of US Patent No. 6,887,692. A bioreactor having zero headspace is disclosed in claim 2 as well the temperature range is disclosed in claim 3. Biosolids can be generated as disclosed in claim 11.

U.S. Patent No. 5,821,111 teaches production of hydrogen in bioreactor under anaerobic conditions, wherein the biological process is provided for converting waste biomass to hydrogen using one or more microorganisms capable of producing hydrogen. Note the abstract and column 2, lines 20-26. Photosynthetic bacteria are disclosed to be useful, note column 2, line 36, and a major problem of operating continued stir type reactors (cstr) is overcome by maintaining high cell concentrations in the reactors using hollow fibers to separate out microorganisms that are entrained, note column 15, lines 16-39. The hollow fiber is permeable and has a lumen affording it with an increased surface area capable of maximizing gas Three tasks were performed to maximize hydrogen production: conditions of light, pH and temperature; determination of reaction rates and volumes; and process design based upon previous two tasks. Note column 2, lines 37-44. From task two complete bioconverison was observed to be obtainable with short retention times in the bioreactor, note column 2, lines 50-53. During hydrogen production, carbon dioxide is produced as well but removed, note column 7, lines 1-2. Further, at column 8, lines 16-28, the desire to control

methanogenic bacteria in the bioreactor is also disclosed, as well as the addition of a chemical inhibitor of methanogenic bacteria, such as methyl viogen.

U.S. Patent No. 4,052,173 teaches using a carbon dioxide scrubber for removing carbon dioxide during gas production. See Figure 1, no. 139.

The claims differ from claims of U.S. Patent No. 6,887,692 in that inhibiting-conditions of methane producing bacteria and addition of a chemical inhibitor, therefore, as well as not describing low retention times in the bioreactors and removal of carbon dioxide via a carbon dioxide scrubber are not disclosed claim limitations in the claims of U.S. Patent No. 6,887,692.

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to produce hydrogen as disclosed by U.S. Patent No. 6,887,692 using low retention times in the bioreactors and removing carbon dioxide via a carbon dioxide scrubber as disclosed by U.S. Patent No. 5,821,111 and U.S. Patent No. 4,052,173 because the cited prior art teaches that these process steps have been selectively carried out.

The production of hydrogen in process employing two stage anaerobic bioreactors is clearly taught by the cited claims of U.S. Patent No. 6,887,692 as well as a bioreactor having a plurality of hollow semipermeable fibers having an outer surface coated with a biofilm comprising at least one hydrogenogenic bacteria. To form and remove hydrogen from within the lumen of the hollow fibers and to reduce and maintain retention time in the first and second stage bioreactors in order to respectively maximize mass gas transfer is clearly an obvious modification of the combined cited prior art.

U.S. Patent No. 5,821,111 teaches that complete bioconversion of at least one biodegradable solid to hydrogen is obtained when retention times in the bioreactor were shortened, note column 2, lines 51-52. Therefore, one of skill would have been motivated to shorten the retention time in the first and second stage bioreactors of the claimed process taught by U.S. Patent No. 6,887,692; and further the prevention of methanogenic bacteria in the first stage bioreactor would have been an expected successful result of maximizing hydrogen production as shown by Table 2, column 28, line 50 and taught at column 8, lines 15-29.

Furthermore, to add a chemical to prevent or inhibit methanogenic bacteria is disclosed by U.S. Patent No. 5,821,111, note column 8, lines 15-29. Also to remove carbon dioxide in a process of hydrogen production is clearly disclosed by U.S. Patent No. 5,821,111, and to do so and recover it using a carbon dioxide scrubber is disclosed by U.S. Patent No. 4,052,173. Thus, in the absence of persuasive evidence to the contrary the claims are deemed *prima facie* obvious over the cited prior art.

All claims fail to be patentably distinguishable over the state of the art discussed above and cited on the enclosed PTO-892 and/or PTO-1449. Therefore, the claims are properly rejected.

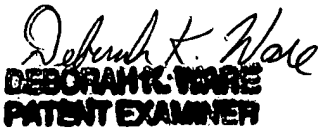
The remaining references listed on the enclosed PTO-892 and/or PTO-1449 are cited to further show the state of the art.

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah K. Ware whose telephone number is 571-272-0924. The examiner can normally be reached on 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DEBORAH K. WARE
PATENT EXAMINER

Deborah K. Ware
December 2, 2005